

## Early Cenomanian, Mantelli zone, ammonite assemblage, from a carbonate shelf edge sequence (Matese, Central Apennines)

Giovanni Accordi<sup>1</sup> & Giovanni Pallini<sup>2</sup>

<sup>1</sup> Centro di Studio per il Quaternario e l'Evoluzione Ambientale, C. N. R.,

c/o Dipartimento di Scienze della Terra, Università "La Sapienza", P. le A. Moro 5, 00185 Roma (Italy)

<sup>2</sup> Dipartimento di Scienze della Terra, Università "La Sapienza", P. le A. Moro 5, 00185 Roma (Italy)

**ABSTRACT** - An Early Cenomanian ammonite assemblage, Mantelli zone, was found in the northern sector of the Matese carbonate platform. In this region an Upper Cretaceous rimmed platform succession crops out. Rudists, gastropods, bivalves, brachiopods and corals occur together with the ammonites. Pelagic microfossil assemblages, characterized by abundant calcisphaeres, planktonic and shallow-water benthonic foraminifers, typical of shelf edge to slope environments, are also present. The occurrence of this diverse pelagic sequence, overlying inner platform deposits, gives further evidence of the Late Cretaceous transgression which characterizes the Matese platform and other areas of the central and southern Apennines.

**KEY WORDS:** Cenomanian, ammonites, planktonic foraminifers, carbonate platform, central Apennines, Italy.

### INTRODUCTION

The Matese carbonate succession has been recently the subject of geologic, paleontologic and stratigraphic investigations, especially for two reasons: the first is related with its position between the Latium-Abruzzi and Apulian platforms, and thus with its specific characters of paleontological affinity with both of these paleogeographic domains; the second is the abundance of outcrops with well preserved fossils, allowing identification of vertical and horizontal facies relationships through various depositional environments of the carbonate platform (Accordi *et al.*, 1982; Accordi & Carbone, 1988, 1990; Accordi *et al.*, 1990; Carbone, 1990; Cherchi *et al.*, 1993).

During field surveys along the northern Matese shelf edge, a 5 m-thick sequence was found along the Guardiaregia - Campitello Matese road, on the southern slope of Serra Le Tre Finestre (Fig. 1).

The sequence yielded a rich ammonite fauna referred to the Early Cenomanian Mantelli zone, interfingering with radiolitid-rich layers.

The occurrence of Cretaceous ammonites in carbonate shelf edge deposits is a rare event (e. g., Accarie & Delamette, 1991), useful for stratigraphic correlation between neritic and pelagic domains.

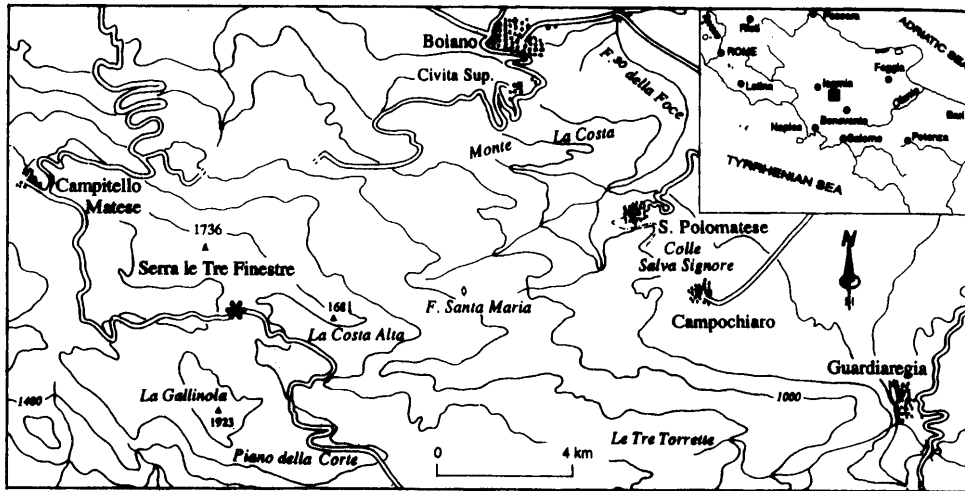


Fig. 1 - Location map of the ammonite bearing sequence in northern Matese Mts.

#### SERRA LE TRE FINESTRE OUTCROP

The outcrop starts with a 1.5 m upward shoaling sequence of mudstones - wackestones with the nerineid *Mutityxis olisiponensis* (Sharpe), and radiolitids, orbitolinids, textulariids and miliolids, passing to an orbitolinid grainstone, typical of shallow - protected water environment (Fig. 2). The orbitolinid grainstone is truncated by an emersion surface and is overlain by the ammonite-bearing sequence, indicative of a transgressive phase due to a relative sea level rise greater than the rate of carbonate aggradation. As a consequence, an overlapping open marine facies begins with a muddy layer of ammonite wackestone rich in calcisphaeres, benthonic and planktonic foraminifers, among which *Favusella washitensis* (Carsey) and *Rotalipora cf. appenninica* (Renz) were identified, and well sorted, fine grained rudist debris (Pl. 1, fig. 8).

This episode is followed by a layer of gravel made up of poorly-rounded, densely-packed rudist fragments, orbitolinids and carbonate lithoclasts with sparry cement, which testify to mobile, at times emergent sandy shoals. The sequence evolves toward radiolitid (*Sauvagesia* sp.) wackestones to grainstones, characterized by a variable amounts of muddy and silty matrix, containing calcisphaeres, benthonic and planktonic foraminifers. Then a second ammonite layer occurs, very rich in calcisphaeres and planktonic foraminifers, among which *Costellagerina lybica* (Barr), *Hedbergella delrioensis* (Carsey), *Heterohelix moremani* (Cushman), *Praeglobotruncana delrioensis* (Plummer), and *P. gr. stephani* (Gandolfi) were identified.

#### AMMONITE ASSEMBLAGE

The Cenomanian ammonite assemblage consists of some species very rare in Italy, as the faunas of the Mantelli zone are cited only by Maugeri Patanè (1932) in Sicily near

Cenomanian ammonite assemblage

DEPOSITIONAL SEQUENCE	FACIES	LITHOLOGY	DOMINANT MICROFOSSIL ASSEMBLAGE
5m aggrading open marine shelf edge	radiolitid grainstone		textulariids, hedbergellids, praeglobotruncanids, calcisphaeres
	radiolitid wackestone		hedbergellids, praeglobotruncanids, calcisphaeres
	ammonite wackestone		<i>Costellagerina lybica</i> , <i>Hedbergella delrioensis</i> , <i>Heterohelix moremani</i> , <i>Praeglobotruncana delrioensis</i> , <i>Praeglobotruncana</i> sp. <i>stephani</i> , calcisphaeres
	radiolitid packstone		<i>Favusella washitensis</i> , calcisphaeres
	orbitolina rudstone		orbitolinids
	ammonite wackestone		<i>Favusella washitensis</i> , <i>Rotalipora</i> cf. <i>appenninica</i> , hedbergellids, calcisphaeres
2 emersion surface	orbitolina grainstone		orbitolinids
	radiolitid wackestone		orbitolinids, <i>Cuneolina</i> sp., textulariids, miliolids
	nerineid mudstone		very rare orbitolinids, <i>Multipyxis olisiponensis</i>
	orbitolina wackestone		<i>Cayeuxia</i> sp., <i>Cuneolina</i> sp., orbitolinids, miliolids, textulariids
1 upward shoaling shelf lagoon			

Fig. 2 - Section of the Early Cenomanian, Mantelli zone, ammonite outcrop.

Caltavuturo and Boschitello di Vizzini. Some specimens from these localities are also present in the collections of the Department of Earth Sciences Museum of Palermo.

The ammonite assemblage yielded the following species:

### Lower bed

*Hypoturrilites gravesianus* (d'Orbigny), 1 specimen (Pl. 1, Figs 4, 7; Pl. 2, Fig. 7),  
*Tetragonites* cf. *spathi* Fabre, 2 small specimens (Pl. 2, Fig. 1),  
*Tetragonites subtimotheanus* Wiedmann, 4 specimens (Pl. 2 Figs 4, 5, 8, 9),  
*Zelandites* sp., 1 specimen (Pl. 2, Fig. 3),  
*Puzosia* sp., probably *P. mayorana* (d'Orb.), 1 specimen (Pl. 1, Fig. 2),  
*Mantelliceras mantelli* (Sowerby), 2 specimen (Pl. 1, Figs 5, 8),  
*Mantelliceras lymense* (Spath), 1 specimen (Pl. 2, Fig. 6).

### Upper bed

*Phylloceras* sp., 5 specimens,  
*Sciponoceras baculoide* (Mantell), 1 specimen (Pl. 1, Fig. 6),  
*Tetragonites spathi* Fabre, 5 small specimens (Pl. 2, Fig. 2),  
*Gaudryceras cassisianum* (d'Orbigny), 3 specimens (Pl. 1, Fig. 3),  
*Desmoceras* sp., 5 specimens (Pl. 1, Fig. 1).

These species are well represented in the Kennedy's assemblage (1994) recognized at the Pointe des Lombards - Cassis - France.

*Sciponoceras baculoide* (Mantell), with oblique constrictions, is very close to the specimen figured in Kennedy (1994, Pl. 12, Figs 1, 2).

*Tetragonites subtimotheanus* Wiedmann. The adult specimen corresponds with the specimen of Kennedy (1994, Pl. 4, Figs 12, 13).

Our specimens of *Tetragonites spathi* Fabre, are smaller but similar to Kennedy (1994, Pl. 2, Fig. 15).

*Gaudryceras cassisianum* (d'Orbigny) shows a certain resemblance with Kennedy's specimens (1994: Pl. 2, Figs 8, 9).

*Zelandites* sp. is similar to *Zelandites europae* Wright & Kennedy described and figured in Kennedy 1994: 219, Pl. 3, Figs 1-3.

*Mantelliceras mantelli* (Sowerby) specimen are similar to the specimen of Kennedy (1994, Pl. 7, Figs 1, 2).

*Mantelliceras lymense* (Spath), with alternating strong and faint ribs, are similar to the specimen of Kennedy (1994, Pl. 7, Figs 3, 4).

*Puzosia* sp. (?*P. mayorana* (d'Orb.)). Only a badly preserved peristoma's fragment was found. The dimension, the constrictions, the intercalate ribs and, especially, the flat flank are characters similar to those shown by the specimen of Kennedy (1994: 220, Pl. 5, Figs 1, 2).

?*Desmoceras* sp. Some small, very rounded specimens, uncertainly referable to this genus, were found.

*Phylloceras* sp. some small specimens, not determinables at specific level, were found.

Only *Hypoturrilites gravesianus* (d'Orb.) is not present in Kennedy's material. Our well preserved specimen is comparable with the specimen figured by Atabekian (1987, Pl. 19, Fig. 6), found in the middle part of the *M. mantelli* zone of the left side of the Soumbar River of the southern Russia.

## CONCLUSIONS

The identified ammonite species represent, as a whole, a well documented Early Cenomanian (Mantelli zone), Tethyan fauna. The assemblage consists of both juvenile and adult forms, preserved as entire moulds and, sometimes, as tests, indicating a short *post-mortem* transport.

The alternating ammonite- and radiolitic- rich layers, as well as the sudden textural changes of the sediment, give evidence of the unstable environmental conditions of this shelf edge, particularly at the Albian - Cenomanian transition. At this time, the Matese carbonate platform was characterized by strong tectonic activity (Accordi *et al.*, 1982), testified by the occurrence of bauxite deposits in inner platform areas, widespread traces of paleokarst and accumulation of eroded clastic material of shallow-water carbonates along the edges and slopes.

In the Matese platform, and more generally in the central and southern Apennines, the Cenomanian is characterized by an extensional faulting phase, especially prominent in the areas bordering the platforms, where huge blocks are drowned, causing the onlapping of slope and basin sequences on inner platform deposits (Carbone, 1993). Therefore, our sequence could be related either to incipient foundering of a platform sector, or to a maximum transgression due to eustatic sea level rise.

## ACKNOWLEDGMENTS

The authors wish to thank I. Premoli Silva for helping in the classification of some planktonic foraminifers and for her criticisms; G. Sirna for helpful discussion on the paleogeography of the investigated area; A. A. Atabekian and J. Kennedy for providing essential bibliography and helping in the classification of some ammonite taxa; our friend F. Carbone for his stimulating discussions during the field work and J. S. Pignatti for the constructive review of the paper. P. Faraoni and A. Marini greatly helped during the field work and preparation of some ammonite specimens.

Thin sections were prepared by A. D'Arpino and C. D'Arpino, drawings by M. Albano; L. T. Di Pietro and M. Salvati.

All specimens are preserved near the Dipartimento di Scienze della Terra Università di Roma "La Sapienza".

## REFERENCES

- ACCARIE H. & DELAMETTE M. (1991) - Découverte d'ammonites albiennes dans le massif apennin de la Maiella (plate-forme lazio-abruzzaise, Italie centrale): précision sur la durée du hiatus bauxitique médio-cretacé. *Cretaceous Research* **12**: 81-90.
- ACCORDI G. & CARBONE F. (1988) - Sequenze carbonatiche meso- cenozoiche. *In*: Accordi G. & Carbone F. (Eds.): Carta delle lithofacies del Lazio - Abruzzo ed aree limitrofe. *Quad. Ric. Scient.*, **114** (5): 11-92.
- ACCORDI G. & CARBONE F. (1990) - Cretaceous depositional systems in north-eastern Matese. *2nd Internat. Conf. on Rudists*. Rome-Bari, Oct, 1990, field trip: 11-18.
- ACCORDI G., CARBONE F. & SIRNA G. (1982) - Relationships among tectonic setting, substratum and benthonic communities in the Upper Cretaceous of Northeastern Matese. *Geologica Romana*, **21**: 755-793.

- ACCORDI G., CARBONE F., CESTARI R., REALI S. & SIRNA G. (1990) - Cretaceous Rudist colonization in north eastern Martese. 2nd Internat. Conf. on Rudists. Rome-Bari, Oct, 1990, field trip: 19-43.
- ATABEKIAN A. A. (1987) - Turrilitidae de l'Albien supérieur et du Cénomaniens du sud de l'USSR. Assoc. Geolog. Aubeise: 1 - 86.
- CARBONE F. (1990) - Pre- and syn-collisional evolution of central Apennine carbonate sedimentary units (Central Italy). 2nd Internat. Conf. on Rudists. Rome-Bari, Oct, 1990, field trip: 3-9.
- CARBONE F. (1993) - Cretaceous depositional systems of the evolving Mesozoic carbonate platform of central Apennine thrust belt, Italy. *Geologica Romana*, **29**: 31-53.
- CHERCHI A., RUBERTI D. & SIRNA G. (1993) - Osservazioni biostratigrafiche sul Cretaceo del Matese Centro Settentrionale (Italia Centrale). *Boll. Soc. Geol. Ital.* **110**: 91-110
- KENNEDY W. J. (1994) - Cenomanian ammonites from Cassis, Bouches - du Rhône, France. *Paleopelagos Special Publications* **1**: 209-254.
- MAUGERI PATANÈ G. (1932) - Introduzione allo studio geo-paleontologico di M. Uncina e dintorni (Messina). *Boll. Soc. Geol. Ital.* **51**: 115-170

Plate 1

- Fig. 1 - *Desmoceras* sp., CM 43, natural size, upper bed.
- Fig. 2 - *Puzosia* sp. (?*P. mayoriana* d'Orbigny), CM 46, natural size, lower bed.
- Fig. 3 - *Gaudriceras cassisianum* (d'Orbigny), CM12, natural size, upper bed.
- Figs 4, 7 - *Hypoturrilites gravesianus* (d'Orbigny), CM 24, lower bed. Fig. 4, natural size. Fig. 7, x 2.
- Figs 5, 8 - *Mantelliceras mantelli* (J. Sowerby), CM 32, lower bed. Fig. 5, natural size. Fig. 8, x 2.
- Fig. 6 - *Sciponoceras baculoide* (Mantell), CM 001, natural size, upper bed.

All specimens are Early Cenomanian, Mantelli zone, in age.

Plate 2

- Fig. 1 - *Tetragonites spathi* (Fabre), CM 006, natural size, lower bed.
- Fig. 2 - *Tetragonites* cf. *spathi* (d'Orbigny), CM13, natural size, upper bed.
- Fig. 3 - *Zelandites* sp. CM 67, x 2, lower bed.
- Figs 4, 5 - *Tetragonites subtimoteanus* Wiedmann, CM 16, lower bed. Fig. 4, x 2. Fig. 5, natural size
- Fig. 6 - *Mantelliceras lymense* (Spath) CM 83, natural size, lower bed.
- Fig. 7 - *Hypoturrilites gravesianus* (d'Orbigny), CM 24, natural size, lower bed.
- Figs. 8, 9 - *Tetragonites subtimoteanus* Wiedmann, CM 41, natural size, lower bed. 8) Inner whorl with a large fragment of *Sauvagesia* sp.

All specimens are Early Cenomanian, Mantelli zone, in age.

Plate 1

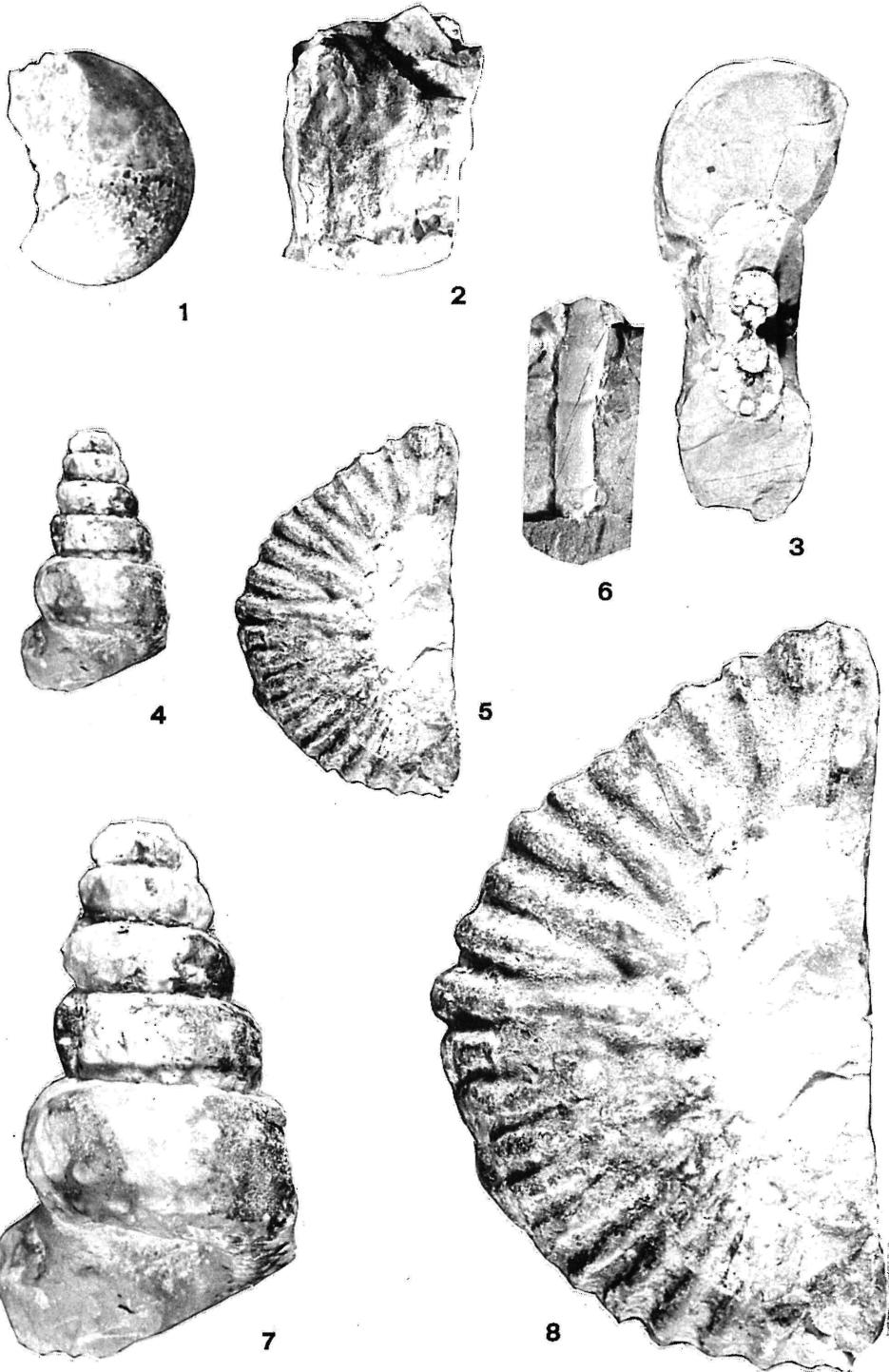


Plate 2



1



2



3



4



5



6



7



8



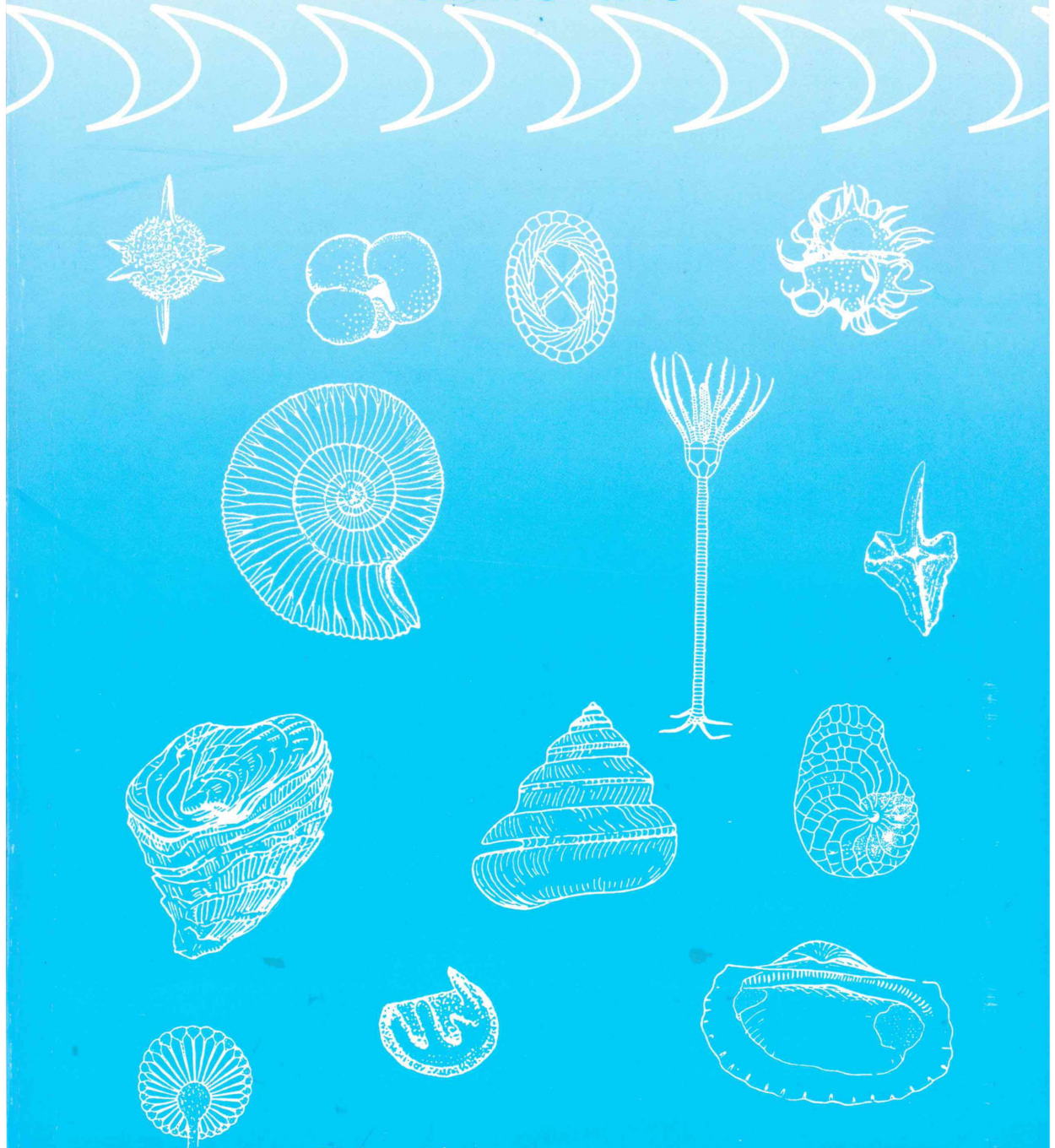
9



ISSN 1121 - 1393

# PALAEOPELAGOS

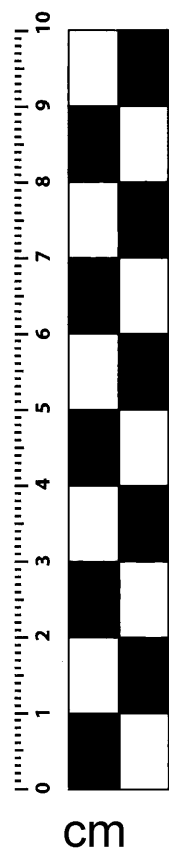
Volume 6 - 1996



Università "La Sapienza" Roma

Licenziato alle stampe il 20 dicembre 1996  
Finito di stampare Aprile 1997

Tipolitografia RIVER PRESS srl - Roma



cm